

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 13 SEP 2004

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To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/002423

International filing date (day/month/year)
08.06.2004

Priority date (day/month/year)
09.06.2003

International Patent Classification (IPC) or both national classification and IPC
G01N27/447

Applicant
IMPERIAL COLLEGE INNOVATIONS LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 65.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/002423

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/002423

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 1-99 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-99 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-99 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: PATENT ABSTRACTS OF JAPAN vol. 2000, no. 21, 3 August 2001 (2001-08-03) & JP 2001 104821 A (HITACHI LTD), 17 April 2001 (2001-04-17)
- D2: RAYMOND D E ET AL: 'CONTINUOUS SAMPLE PRETREATMENT USING A FREE-FLOW ELECTROPHORESIS DEVICE INTEGRATED ONTO A SILICON CHIP' ANALYTICAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY. COLUMBUS, US, vol. 66, no. 18, 15 September 1994 (1994-09-15), pages 2858-2865, XP000478030 ISSN: 0003-2700
- D3: WO 98/23368 A (BARRETT ANTHONY GERARD MARTIN ;SMITH MARIE (GB); MANZ ANDREAS (GB)) 4 June 1998 (1998-06-04)
- D4: WO 01/96857 A (VYKOUKAL JODY ;UNIV TEXAS (US); BECKER FREDERICK F (US); GASCOYNE) 20 December 2001 (2001-12-20)
- D5: DE 21 41 245 A (MAX PLANCK GESELLSCHAFT) 1 March 1973 (1973-03-01)

The document **D1** is regarded as being the closest prior art to the subject-matter of claims 1, 39, and 68, in view of the present wording of the claims, and shows a sample dispensing device comprising a sample separation chamber (2) and a magnetic field unit (230) which intersects with the flow direction of the sample at 90 degrees.

Therefore D1 seems to comprise all structural features of present claim 1. However, the subject-matter of claims 1, 39, and 68 differs from this known D1 in that free flow electrophoresis and a microchip are explicitly mentioned. These features imply electrodes and a monolithic structure on a substrate.

The subject-matter of claims 1, 39 and 68 is therefore considered to be novel over D1 (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as implementing a device according to D1 on a microchip and using it for free flow electrophoresis.

The solution to this problem proposed in claims 1, 39 and 68 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

D2 and **D3** disclose free flow electrophoresis on a microchip but do not hint the application of a magnetic field.

D4 teaches the combination of dielectric separation and magnetophoresis, but the interdigitated electrode structure for AC current application leads away from the present invention.

D5 teaches a combination of electrophoresis and orthogonal magnetic field, but no hint is given on an integration on a microchip.

Claims 2-38, 40-67 and 69-99 are dependent on claims 1, 39 and 68 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VII

Independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Although claims 39 and 68 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought ..and/or.. in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.